

Master Project: Experimental quantification of simultaneous water states, fluxes and BVOCs exchange in agricultural soils.

Introduction

Biogenic volatile organic compounds (BVOCs) are assumed to be produced by plants and are involved in plant growth, reproduction, and defense. They are emitted from vegetation into the atmosphere and have significant effects on other organisms and on atmospheric chemistry and physics. Very recently, empirical evidence has been created, which show that BVOCs can be also emitted by soil microorganisms in amounts even higher than those from plants. Furthermore, it has been shown that soil water content dynamics drive BVOCs exchange to and from soils. However, the exact relationship between water states and fluxes and BVOCs sinks/sources is still not known.

Hypotheses

This project is aiming on testing the following hypotheses:

1. BVOCs emission and/or uptake are highly affected by the percent of organic matter in the soil and the water content.
2. The dynamics of BVOCs exchange are subject to memory effects, following the hysteretic water content vs matric potential relationship.

Methods

Soil samples will be collected from an agricultural field, where prior knowledge is available. Dynamic evaporation/wetting experiments will be conducted in the laboratory, where water matric potential, water fluxes as well as BVOCs exchange rates will be measured in high temporal resolution. The experiment will be conducted for soils with and without organic matter, and for packed and undisturbed soil columns (effect of soil structure).

Contact person / supervisor:

Supervisors: Anke Nölscher, anke.noelscher@uni-bayreuth.de (50%)

Efstathios Diamantopoulos, efstathios.diamantopoulos@uni-bayreuth.de(50%)